

Originating Committee: Tank Waste Committee

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Version #: 3

Date Revised: 10/28/2021

Color: ☐ Pink ☐ Yellow ☐ Green ☐ Buff ☐ Purple ☐ Blue ☐ Goldenrod

Letter Heading:

To: [Names, titles, and organizations, as appropriate] – Check boxes on last page for distribution

Subject: Responding to Leaking High-Level Radioactive Waste Tanks

Background:

The recent leak of Hanford’s Single Shell High-Level Nuclear Waste Tank (SST) B-109 reminded us all of some truths. The SSTs are long past their designed life, they have leaked in the past and will continue to develop new leaks in the future. Tank leaks take a long time to verify and are hard to stop before the opportunity to effectively respond to the leak is gone. Current estimates are that 3.37 million gallons of liquid (6% of the 56 million total gallons of waste in the tanks) still reside in the SSTs, decades after a previous campaign to remove the majority of the pumpable liquid into double shell tanks. This liquid contains a significant inventory of soluble chemicals and radionuclides that would be added to the long-term management burden and cost on the Central Plateau if they leak before they can be retrieved.

“Do no harm during cleanup” is a value held by the Hanford Advisory Board since its inception in 1994. Board concerns about the long timeframe required to mobilize infrastructure in response to a leaking tank, the looming lack of tank space to receive waste as tanks fail, and uncertainty around future decisions regarding removal of tank waste that has leaked into the soil is the driving force behind this advice.

The April 29, 2021 announcement of leaking SST B-109 came after two years of assessment and study. Current estimates show 13,000 to 15,000 gallons of drainable liquid remaining that may take anywhere from a few to a dozen years before the liquid drains completely into the soil. It is likely that the tank has been in communication with the environment for years and will have the capacity for continued release to the environment until this tank is retrieved. Under current planning, retrieval of this tank would not begin until the year 2043.

In public forums, DOE has said that it would prefer to take no additional action to stem the leak of SST B-109. Inaction goes against the Board’s “do no harm” value and defies legal requirements to act, by withdrawing leaking tanks from service, and draining as much liquid waste as necessary to

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stop the leak immediately or as soon as feasible¹. In 2013, when the SST T-111 was similarly declared to be leaking, Washington’s Governor announced that the State has a “Zero Tolerance” policy for new tank leaks. Board Advice 271², advised DOE to, “remove the drainable liquid from Single-Shell Tanks, focusing first on leaking tanks.”

DOE has referred to the amount of contamination leaking from B-109 as “small” in comparison to contamination which was previously discharged or leaked from tanks and cribs in the same area. While it is expected that contamination from the B-109 tank leak would begin to reach groundwater in 20-25 years and be captured by the pump and treat system, it would continue to add contamination to the groundwater long into the future.

DOE has also stated that, if resources were deployed to empty this tank and relocate the waste to a double-shell tank miles away, it would delay the operation of the Direct Feed Low Activity Waste (DFLAW). The Board believes that there should be adequate funding to ensure that responding to the leaking of radioactive tank waste does not compete with DFLAW or other cleanup missions at Hanford.

There is currently no plan to proactively mitigate current and future SST leakage. While it is encouraging that Ecology and DOE have begun formal discussions concerning the response to the B-109 leak and the potential development of a site-wide leak response plan for all SSTs, the Board believe these discussions should have a firm deadline for development of a plan and implementation of legally required removal of waste. The Board also supports broad public involvement in these efforts.

Based on the Monthly Waste Tank Summary Report from May 2021³, there are approximately 3.37 million gallons of drainable interstitial liquid and supernatant still contained in all the SSTs (6% of the 56 million total gallons of waste in the Hanford tanks). Current estimates identify over four decades before the last SST is retrieved. More tanks are certain to leak. The Board believes an actionable/implementable plan is needed, encompassing development of the tools and risk management response strategies necessary for safeguarding human health and the environment from the release of these liquid wastes. DOE should also fund tank waste leak response proactive abatement and technology development for Hanford.

1 “A tank system... from which there has been a leak or spill... must be removed from service immediately.” WAC 173-303-640(7). “[i]f the release was from the tank system, the owner/operator must, within twenty-four hours after detection of the leak or, if the owner/operator demonstrates that it is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further release of dangerous waste to the environment.” WAC173-303-640(7)(b)(i).

2 https://www.hanford.gov/files.cfm/HABAdv_271.pdf

3 <https://pdw.hanford.gov/document/AR-14788>

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The Board notes the 2020 Hanford SST Liquid Retrieval Study⁴ found that enhanced saltwell pumping was tied as the top contender for methods to remove additional interstitial liquid from a tank. T Successfully used at the Savannah River Site to remove interstitial liquid from their tanks, it was highly rated in the 2020 study for its design maturity and likelihood of success. In response to the study, Washington State Department of Ecology (Ecology) proposed⁵ that DOE pursue pilot projects implementing the top two technologies in an actual Hanford tank. This proposal was suggested before it was known that B-109 had formally become an active leaker. The Board champions a pilot project as it seems a worthy goal to try to add a new liquid removal capability to the tool set at Hanford. It could proactively prevent harm to the environment if deployed in tanks with high release potential.

The Board also observes that the Test Bed Initiative (TBI) proposes to use an in-tank pump with integrated pretreatment, followed by offsite disposal of the resulting low activity waste⁶. The Board would like to see a formal assessment of whether simple adjustments can make this concept compatible with enhanced saltwell pumping of SST interstitial liquid to allow offsite disposal of that portion of the tank waste that is presently at the highest risk of reaching the environment.

The Board understands that any action on the site is costly, especially actions surrounding the tanks. The Board also understands the DOE position that money is best spent when it forwards the treatment mission, and we believe that developing tools for tank leak abatement is a worthy investment to forward this mission and prevent further harm to the soil and groundwater. We ask the agencies to consider whether a reasonable investment in a new combination of tools might offer a win-win solution.

Advice:

The Board offers the following advice to the agencies:

1. The Board states as a value that abating and responding to SST leaks should be a policy goal of the Hanford mission. Action to abate the harm from the leak must not be delayed by lengthy processes. The public should be afforded a formal comment opportunity on response options.
2. The Board advises the TPA agencies to invest in proactive abatement technologies to mitigate tank leaks now and in the future, with a special focus on new ways to address interstitial liquids remaining in the SSTs.

4 <https://pdw.hanford.gov/document/AR-04274>

5 <https://pdw.hanford.gov/document/AR-04419>

6 https://www.hanford.gov/files.cfm/Final_TWC_TBIPhasell_010919.pdf

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3. In order to make good policy advice, it is necessary for the Board to understand additional dimensions of this issue. Therefore, the Board requests the agencies to provide information and feasibility assessment that includes enhanced salt well pumping, application of the TBI concept to extracted interstitial tank liquids, and/or onsite storage options for interstitial liquids once highly radioactive constituents are removed. The outcome of this additional analysis should clarify technological and policy solutions to address both B-109 and the risk of future SST leaks and feed into broader planning.
4. **The Board advises the TPA agencies to develop a formal leak mitigation plan for the SST System as soon as possible.** This plan should be transparent and include input from regulators, the public and the Tribes. The Board supports a pilot test of enhanced salt well pumping in an SST as proposed in the December 2020 letter from Ecology to DOE.
5. **The Board advises the TPA agencies to develop greater agility to respond to future SST leaks by including a program with the capacity to abate the risk of leaking SSTs in the baseline Hanford budget.** The TPA agencies should advocate for additional investment by DOE in technology development focused on rapid mobile retrieval of leaking tanks as a national priority.
6. **The Board advises the TPA agencies to deploy borehole logging and ex-tank monitoring around future suspected leaking tanks.** Based on the B-109 Formal Leak Assessment report, it appears that the leak assessment process for B-109 could have arrived at a determination significantly sooner if gamma borehole logging and ex-tank monitoring had been employed earlier in the process.
7. **The Board advises DOE to include Ecology and potentially other non-DOE and contractor experts in the tank leak assessment process.** The lead regulatory agency should be involved for any process that evaluates data to determine whether a Resource Conservation and Recovery Act (RCRA)-regulated tank has lost containment.
8. The Board advises DOE to evaluate the potential impacts of ("to", rather than "of"?) pump and treat operations near SST tank farms in the identification of new leaks.
9. The Board advises DOE to conduct a supplemental risk assessment to evaluate and communicate the cumulative impact assuming the 3.37 million gallons of single-shell tank interstitial liquids were to leak before removal of all wastes from SSTs might be completed. This assessment should evaluate various scenarios, not assuming TPA deadlines are met. This risk assessment may support prioritization of SST leak response planning actions.

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References:

1. Hanford Advisory Board Advice #271, "Leaking Tanks (HAB Consensus Advice #271), dated September 6, 2013; https://www.hanford.gov/files.cfm/HABAdv_271.pdf
2. Single-Shell Tanks Liquid Retrieval Study, KA White, May 2020; <https://pdw.hanford.gov/document/AR-04274>
3. Department of Ecology's Review of Single-Shell Tank Liquids Retrieval Study, RPP-RPT-62098, Rev. 0, and Fulfillment of Tri-Party Agreement (TPA) Milestone M-045-093, Jeffery J. Lyon, December 8, 2020; <https://pdw.hanford.gov/document/AR-04419>
4. Hanford Tank Waste Strategy – Test Bed Initiative-Phase II, DOE Office of River Protection, January 9, 2019; https://www.hanford.gov/files.cfm/Final_TWC_TBIPhasII_010919.pdf
5. Waste Tank Summary Report for Month Ending May 31, 2021, HNF-EP-0182 Rev 401, A.M. Templeton, July 13, 2021; <https://pdw.hanford.gov/document/AR-14788>

Attachments:

- Leaking Tanks Advice #298, September 20, 2018: https://www.hanford.gov/files.cfm/HAB_Advice_298.pdf
- Leaking Tanks Advice #271, September 06, 2013: https://www.hanford.gov/files.cfm/HABAdv_271.pdf.
- DOE Response to Advice #271: https://www.hanford.gov/files.cfm/HAB_ORP_Response271.pdf

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CC/BCC:

☐ **TPA Agency Representatives**

- ☐ Ike White, DOE-EM
- ☐ Todd Shrader, DOE-EM
- ☐ Brian Vance, DOE
- ☐ Stanley Branch, DOE
- ☐ Gary Younger, DOE
- ☐ Roberto Armijo, EPA
- ☐ Laura Buelow, EPA
- ☐ Ryan Miller, ECY
- ☐ Ginger Wireman, ECY

☐ **Site-Specific Advisory Boards**

- ☐ Savannah River Site Citizens Advisory Board
- ☐ Nevada Site Specific Advisory Board
- ☐ Northern New Mexico Citizens Advisory Board
- ☐ Paducah Citizens Advisory Board
- ☐ Oak Ridge Site Specific Advisory Board
- ☐ Idaho Cleanup Board
- ☐ Portsmouth Site Specific Advisory Board
- ☐ Kelly Snyder, DFO

☐ **OR/WA Congressional Delegations (to Chief of Staff)**

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| <input type="checkbox"/> Senator Maria Cantwell, WA | <input type="checkbox"/> Rep. Marilyn Strickland, WA-10 |
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☐ **Write-in/Additional**

☐ **Requests to Receive Advice**

- ☐ Jessica Keys